

ANDREA PETRI

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EDUCATION

Columbia University, Graduate School of Arts and Sciences

PhD. Physics

M.A. Physics

Relevant coursework:

Advanced Programming Statistical Mechanics Quantum Mechanics

Physical Cosmology Classical Fields and Waves Quantum Field Theory

August 2011 - present

expected 2017

June 2013

Scuola Normale Superiore, Pisa, Italy

B.A. in Physics

July 2011

EXPERIENCE

Research

Astrophysics – Large Scale Structure of the Universe

Summer 2012 - Present

Columbia University, NY

- Worked on Cosmic Microwave Background (CMB) data analysis, with particular focus on temperature image reconstruction starting from raw time ordered data (bolometric and pointing)
- Contributed to the development of CMB map-making software, implemented the corrections for pointing and calibration offsets
- Handled several supercomputing tasks, including planning and production of a 30TB simulated dataset featuring Cosmological N-body systems
- Conducted statistical analysis of Cosmological Large Scale Structure simulated images, with particular emphasis on the development and implementation of new techniques to constrain physical model parameters
- Developed scientific computing software packages in Python
- Served as peer reviewer for the journal Monthly Notices of the Royal Astronomical Society

Project experience

Software engineering

Fall 2013 - Present

Columbia University, NY

- Implemented from scratch the client and server side components of a three tier simple database service, using the C language socket API (code repository available on request)
- Started the development of the LensTools Python library, that will prove useful in Weak Gravitational Lensing data analyses, with particular focus on ray-tracing simulations, astrophysical image analysis, data reduction and statistical inferences of model parameters from measured data (project URL <http://www.columbia.edu/~ap3020/LensTools/html>)

Teaching

Graduate student instructor

Fall 2012 - Present

Columbia University, NY

- Taught several Physics Laboratory introductory courses aimed at pre-medical and engineering track students
- Designed and taught as co-instructor a Modern Cosmology class aimed at high school students in the Columbia Science Honors Program (SHP)

TECHNICAL STRENGTHS

Mathematical tools

Linear algebra, bayesian statistics, image processing

Programming Languages

Python, C/C++, Fortran90, Bash, R

Protocols & APIs

Object Oriented Programming, Parallel Computing (MPI), TCP/IP sockets, HTTP

Databases

MySQL

Tools

Distributed source control (git, mercurial)